whether an extension is warranted. Thus, even if you have reached a conclusion about engineering software or preclusion, you need to consider other factors, as well.

For example, you are undoubtedly aware that other broadband Internet access technologies such as DSL are actively marketing their services in many areas. You and we need to consider the effect of a four or nine-month delay in the filing window on the timing of FCC grants, the rolling out of service, and the competitive position of two-way wireless systems vis a vis those competitive technologies.

In addition, you are also probably aware that proponents of third generation wireless and satellite technologies have argued that the ITFS MMDS band is under-utilized and would be better utilized by their services.

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Indeed, the satellite industry association has already filed a petition to allocate the top and bottom 20 megahertz portions of our band to mobile satellite.

Therefore, you and we need to consider whether and how a delay of the filing window would support these parties' arguments that ITFS and MMDS once again cannot get its act together, and that the 2.5 gigahertz band should be better turned over to their stewardship.

There may be other factors to consider, as well,

and we certainly urge you to keep this in mind. these comments, we're not intending to argue that the window should not be extended, but simply to emphasize that the issues are or may be more complicated than the answer to a particular question about engineering software or We urge you, once again, when these conferences preclusion. are over, to consider all the relevant factors in deciding whether to support or oppose the extension.

With these comments in mind, I'm going to turn the session over to our Moderator, John Schwartz. As you all probably know, John is the founder and president of several non-profit educational organizations that operate ITFS stations throughout the country. John is an active member of the NIA Board of Directors, and has invested much time and energy exploring two-way ITFS opportunities and issues. John has generously agreed to put together and lead this audio conference. John?

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MR. SCHWARTZ: Thanks very much, Todd. mention a little bit about the format. We're going to have presentations of five minutes apiece from each of our five guests. We're going to follow each of these short presentations with a brief period for questions directed to that presenter. After we run through that, we're going to 24 have a section for questions from the audience, which could be directed to any individual. And then, we're going to have a section for questions which the panelists will ask each other, followed by concluding comments from each.

You will want to know how to ask a question because it may be that you want to get yourself queued up.

Operator, can you tell participants how it is that they queue themselves up to ask a question?

OPERATOR: Yes, absolutely. To ask a question today, you'll press the start or asterisk key, followed by the digit 1 on your touch tone telephone. Once again, to ask a question, that will be star.

MR. SCHWARTZ: I'm going to have questions ready in case that there is any lag time. But, of course, we will give preference to audience questions.

I also want to point out that the NIA web site has useful information. The web site is www.itfs.org. We have two conference papers from participants posted, and bios of all of our presenters.

Let me introduce our first presenter. That's John Hidle of Carl T. Jones Consulting Engineers. John and Carl T. Jones were engineers to helped in the presentation of the ITFS 20/20 petition to delay the filing window. John's complete biography can be found on the NIA website. Let me mention that you'd go to the main page at www.itfs.org, and

then, there's a prominent link that says "Articles and Information on Petitions to Delay the Two-Way Filing Window." Click on that link, and you'll get all the bios. John?

MR. HIDLE: Yes. How are you today?

Thank you very much for MR. SCHWARTZ: Great. participating.

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It's my pleasure. I'd like to start MR. HIDLE: out by saying that Carl T. Jones Corporation has worked on ITFS projects for many, many years. But this particular project we started working on almost two years ago. And in the process of doing so, we have followed it very carefully. We have managed to evaluate the software that's available, and we -- after we found Appendix D, we looked at it and decided that we'd better start finding some software that would allow us to accomplish these complex calculations.

And it was not until just recently, early this year when we became aware of the CelPlan wireless global technologies, although we had been evaluating ADX MMDS modules since back in April of 1999. And we -- once we realized that there was a second package available, we sought to obtain access to it, and we did.

We had eight people participate in a three-day training program. And then, we of course bought initially two complete license packages, and we have been using those since we obtained them in mid-April to go about preparing applications for our client. And we have been working since then in five markets so far to prepare applications. But, unfortunately, we have come to the conclusion that we are not -- we are calculating that we will not be able to complete an adequate number of applications in the time that remains.

We have, in the process, identified some situations with both the software packages which lead us to believe, in our attempt on almost -- well, actually, a seven day a week attempt here to run our designs through the software, and we are finding that the run time is extensive. And in a simple calculation, we believe that we are just not going to be able to achieve the volume of applications that we need to achieve for ITFS clients in the time remaining.

So in that regard, we believe that the best thing for our ITFS clients to be able to file during this filing window would be for it to be delayed to some degree to allow our clients to be served.

So that's where we stand.

MR. SCHWARTZ: All right. Are there audience questions ready to go?

OPERATOR: Once again, if you like to ask a question, press Star 1 now. We'll pause just a moment.

MR. SCHWARTZ: While we're waiting for audience questions, John ---

> MR. HIDLE: Yes.

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MR. SCHWARTZ: What would you say the -- Are there existing parts of CelPlan NREDX that do not work right currently? You said it's slow? Is it effective?

MR. HIDLE: We're not absolutely certain. A couple of things we do know that's not a problem with either software package because we haven't received clarification yet from the Commission about the use of the limited exception to the waiver for reduction of the protective service area based on existing interference, or the 15 so-called limited exception.

We do not yet believe there is an adequate clarification of how to do that from the FCC, and we have asked for such clarification. But it has not be forthcoming. That's important in many of the major markets where protective service areas overlap to be used in the calculation of the interference with existing or incumbent 22 stations.

MR. SCHWARTZ: Some of our participants may not 24 understand what the limited exception is and why that's

important. Can you explain that?

MR. HIDLE: Yes. A 1995 order that expanded the protective service area from a 15-mile radius to a 35-mile radius included a special limited exception to the increased PSA size which would be based on existing interference between co-channel stations which, although their 15-mile PSA's did not overlap, the new 35-mile PSA's did. And to allow those stations some leeway for modification, the limited exception allows for a -- creation of a 45 dB D to U contour ratio line to redefine the area within the PSA where interference exists between the existing facilities.

And in those areas where interference exists, then modifications could be made, as long as there was no increase in the geographic area receiving interference. In other words, your existing interference-free area could not be further reduced. That was the purpose of this limited exception when the PSA was increased in size.

MR. SCHWARTZ: Well, (a) why does this matter and, (b) what's the relevance with respect to software?

MR. HIDLE: Well, (a), the reason it matters is because when PSA's overlap currently, there is interference between the stations that reduces the area in which they can maintain their 45 dB D to U. And when one station or another station decides to expand into two-way service, of

course the two-way service would be most severely limited if protection had to be accorded to areas in which interference already existed. And it would be extremely difficult for stations that are co-channeled with overlapping protective service areas to be able to do much in the way of expanding to a viable two-way system.

MR. SCHWARTZ: So you saying, when you prepare applications, you really have to rely on this exception extensively when the systems are closing packed?

MR. HIDLE: That's exactly right. And the relevance as ar as the software is concerned is that, although there was ways that each software package can address the issue, it is still -- neither package of capital of allowing you to calculate the contour ratio line as required by the Commission. And that would have to be done off line, either by specifically available software, or it would have to be done manually, and the results entered into each of the programs.

But neither -- Of course, neither software manufacturer can actually provide that right at the moment because it hasn't been totally clearly defined or clarified by the Commission. But that is, indeed, a software issue that enters into causing us to have to spend additional time creating these modified PSA's, and entering them into the

software to be able to run the evaluations to the incumbent systems.

MR. SCHWARTZ: Do we have any audience questions yet, Operator?

OPERATOR: Not at this time. I would like to remind everyone to press a Star 1. And now, we have a question from Phil Duncan of National Conference on Citizenship.

MR. SCHWARTZ: Phil, your line's open.

MR. DUNCAN: Hello, John?

MR. HIDLE: Hi.

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MR. DUNCAN: This is Phil Duncan at NCOC. licenses in seven markets. I'm not an engineer, obviously. So forgive me. But if you've run -- if you've run both EDX and CelPlan on any market, have they produced the same results, or is there a variance, and is that variance significant?

MR. HIDLE: Well, to answer that question, I'd 19 have to tell you that we have not actually run both packages 20 on the same market. We have been evaluating the EDX 21 software demonstration model so far, and we have not taken 24 the time to try to run the same design on both packages. I really couldn't tell you whether they give you the same 24 results or not.

MR. DUNCAN: Okay, thank you.

MR. HIDLE: Okay, you're welcome.

MR. SCHWARTZ: John, ITFS 20/20 has requested a nine-month postponement of the window, which is roughly double what the consulting engineers requested. Why does this add up to the need for a nine-month delay?

MR. HIDLE: Well, it's a matter of how many applications that we believe we can prepare, based on the interest that we have received from the community. Of course, we were expected to prepare applications in as many as the top 100 markets, depending on from 1 to 4, to maybe even 5 system applications per market. And that's a lot of applications.

And we're also looking into the fact that we bought the fastest computers we can and populated them with the maximum random access memory, and running them over the weekends and overnight, and so forth. We still came to the conclusion that we'd need a lot of time to meet the demand and the expectations.

And I might say that I think part of that was also based on the fact that we've been receiving lots of calls from ITFS licensees from around the country, asking us to take on their application preparation. And of course, at the moment, we don't believe we could do that in good

conscience because we know there's just not time.

MR. SCHWARTZ: All right, thank you very much,

John. And there will be opportunities to ask John further

questions after everybody has made their presentations.

Our next presenter is Leonhard Korowajeeuk. Have I pronounced that right, Leonhard?

MR. KOROWAJEEUK: That's perfect.

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MR. SCHWARTZ: Leonhard is the President of CelPlan, and his full biography is available on the NIA web site at www.itfs.org. Leonhard, your presentation?

MR. KOROWAJEEUK: Good afternoon, gentlemen. We are participating in a very important event for the telecommunications industry that, without doubt, will be a cornerstone for the future development in the wireless telecommunications. Not only the wireless licensing process was changed of all parties, but for the first time, the industry decided to tackle the peer to peer interference issue. The FCC and the engineers that specified what we call the methodology, or Appendix D, brilliantly addressed this challenge.

We at CelPlan very quickly realized the importance of this process, and accepted the challenge of developing software tools that could materialize the methodology.

Today, we consider this methodology an important part of our

broadband technology, and this concept has been extended to the whole broadband universe in terms of our tools.

It was not an easy task due to the difficulties introduced by the peer to peer interference. Much of the ground was already addressed in the methodology, and we just had to build on top of it. CelPlan had the benefit of its existing tools that provide the framework to add the new functionality.

We started our development in September 1999, and had our first on January 4, 2000. The availability of the tool was publicly announced on February 17, at the NIA Conference in Long Beach, and at the CTIA Trade Show February 28th. On April 10, the tool was made commercially available.

We licensed more than 10 entities, totalling more than 150 licenses. We trained more than 100 engineers, and those trained more engineers. Up to now, this software has been used for more than 100,000 hours.

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Our software is very user-friendly, and engineers can start producing applications after two or three days of training, even without the existence of user manuals.

Proficiency is achieved over a period of a month.

All these activities resulted in many software revisions to address all the findings and functionality

request. This resulted in a very powerful tool, extremely friendly and easy to use. We provided very powerful analysis features that slashed the design time considerably. Several optimizations were done to increase the processing speed. We have actively contributed to the improvement in the methodology revisions, which were frozen at the end of April.

On June 2nd, we felt comfortable enough to freeze the formulas and calculations until the filing window -- until the filing window release, 3.A07.

Any field analysis since then does not need to be reworked to take exceptional degeneration of output files which impact very little in time. Some previous study for window-specific cases may have to be re-analyzed.

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To the best of our knowledge, the software is fully compliant with the methodology. It is very stable and mature. It was internally tested by several parties and experimented on different operational systems and many machine brands.

To help in the accuracy and consistency analysis by the independent parties, we introduced in the tools additional text files containing intermediate and final results.

We and other entities have designed hundreds of

markets, from super cell designs to complex motor cell ones. We will continue to improve the tool to increase its efficiency and to automate some procedures. This is the case with the limited exception rule, also known as grandfather interference.

Today, we generate a text file with all the information, and all the user has to do is finalize the data in a spreadsheet. Deportation of the methodology text files is done manually today. We are in the processing of making those two steps fully automatic.

The calculation of the protection of response station (unintelligible) is not required into the filing window, and we gave lower priority to it.

The software has been optimized in terms of speed, and is extremely fast if you consider the calculations that are involved. An RSA/PSA pair has generated more than 10 million parts that need to be calculated, each one with more than 5,000 mathematical calculations. This gives about 50 billion calculations per pair. Each pair is processed today in one to nine minutes, depending on the size of the RSA.

A complete study for small markets can be processed in four hours, and for a very large market, in 30 hours. The major part of this time is computer processing time, and the human intervention is limited to about 10

percent of it. Of course, we need to consider that there is preparation time, and many iterations may be required to clean interference in a market.

The methodology is the complete study -- is the most complete issue to date, defining many parameters to assure that everyone gets the same results in terms of interference analysis. This does not mean that every step in the process will be exactly the same when different parties do the analysis. There are several factors that can differentiate the results, like truncating, (unintelligible) approximations, unit conversions, Centigrade, secondary parameters, and bounding, and so on. Those parameters can cause variation in intermediate results, but should not affect the final analysis.

The interoperability issue has been addressed by the FCC with the text file output, and it is natural that small adjustment might be required when doing the importation. Those adjustments will have to be addressed as they arise, and this is being done already today.

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We sincerely believe that our software is sufficiently developed to design any ITFS and MMDS market according to the rules of the methodology. And that summarizes our position.

MR. SCHWARTZ: All right. Thank you very much,

Operator, do we have an audience question? Leonhard. OPERATOR: Not at this time. I would like to remind everyone to press Star 1 when you have a question.

MR. SCHWARTZ: And you can do this during a presentation, if you like, so you can be queued up at the beginning.

Leonard, let me just reprise a couple of the things that you mentioned that caught my ear. You mentioned a June 2nd freeze in the revisions to CelPlan with respect to the computation algorithms; is that correct?

> MR. KOROWAJEEUK: Yes.

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MR. SCHWARTZ: Does that mean that there were changes in the computation algorithms prior to June 2nd?

MR. KOROWAJEEUK: Yes, definitely.

MR. SCHWARTZ: And what sorts of changes were made prior to that, and roughly, at what time?

MR. KOROWAJEEUK: Well, as I said, there were -the methodology only was frozen on -- at end of April, and we had to implement those changes. And then, of course, the software has been used by many, many users, and there were some feedbacks. So prior to June 2nd, there were changes that could affect specific cases of the analysis, and those cases, we informed our users. And those cases were rerun 24 and redone.

MR. SCHWARTZ: So it may be that substantial amounts of work done prior to June 2nd had to be reworked by the engineers?

MR. KOROWAJEEUK: I wouldn't say substantial, but some work, yes, had to be redone, and they depend on also on what was the -- Each user has different ways of designing things. And so, some cases had to maybe have a substantial redesign. And those were a small percentage.

It depends also when you start. If you start in February, of course. So as it progressed, less and less -The changes affected less and less. And the changes closer to June 2nd affected very few cases. Changes that we did in February and January and March, of course, they probably affected all the results. I would say that after the methodology was frozen, two weeks later, we had -- we were very, very close to the final solution. But some specific cases that we did corrections or updates had to be rerun.

MR. SCHWARTZ: All right. Do we have any audience question yet?

OPERATOR: We do. We have a question from Mark GRANELL of Sprint.

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MR. GRANELL: Leonhard, this is Mark Granell with Sprint. My question is very basic. When you talk about utilization of your tool, and the modifications that were

made, is it true that it was more of a rerunning of the tool, as opposed to necessarily having to rebuild markets and re-enter a conglomeration of data into the tool itself? It was just a matter of essentially updating the version, and maybe rerunning the market analysis?

MR. KOROWAJEEUK: Definitely. All our revisions, they were compatible with the data that existed in the previous revisions. So, basically, we would add more fields to provide text for accuracy analysis and things like this, or we would change some calculations because the methodology changed during the process.

But basically, what the users had to do was to take their existing project and just run it with the new version, if it was affected.

MR. GRANELL: Thank you.

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OPERATOR: And now, we'll hear a question from Spencer Freund of California State University.

MR. FREUND: Yes. Good morning, good afternoon, whatever it may be. A question concerning the issue of interference. You mentioned -- at least what I thought I heard you say was there would be no interference between co-locations within the same region. Is that correct? In other words, if one institution did an analysis, the same should occur if, in fact, all resources are co-located in

the same site; is that true?

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MR. KOROWAJEEUK: I certainly didn't say this.

And I would like you to repeat the question because I

definitely did not say something like this. Repeat, please?

MR. FREUND: Sure, by all means. I wanted to know, you made mention of the issue of interference, that, in fact, when you run an interference analysis, that sites that are co-located -- at least, I thought I heard you say that, should come up with the same numbers and the same interference activities. Is that not the case, or is that the case?

MR. KOROWAJEEUK: Sites that are co-located, are you saying two RSA's, co-located RSA's?

MR. FREUND: Yes.

MR. KOROWAJEEUK: Or PSA's?

MR. FREUND: PSA's.

MR. KOROWAJEEUK: Two co-located PSA's, they should come with the same interference? No, it's not quaranteed. It depends.

MR. FREUND: Could you help me understand what would be the issues where dependence is a problem? Where would they not be the same?

MR. KOROWAJEEUK: Well, first, if they are co-located, they'd certainly have different frequencies. So

they have different interference. Secondly, they might have different characteristics. They can be located, but the tower height can be different, the power can be different, the antenna can be different, and so on.

So based on all of these, of course, you can have totally different results even if they are co-located.

MR. SCHWARTZ: I want to keep us moving along here. The main topic is software readiness, and I want to keep the focus primarily on questions of that character, if possible. Due to time, I'm going to skip to Merrill Weis. There are further questions for Leonhard, there will be a general audience question period following the individual presentations.

Our next presenter is Merrill Weis. Merrill was one of the principal technical consultants in the adoption of the two-way rules. His full biography is available at the NIA web site. Merrill?

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MR. WEIS: Thank you, John. Let me start by pointing out that the methodology is probably one of the more complex pieces of rule-making that the FCC has done. That information comes from the Commission itself, and from others who have looked at it.

And it's that way for a reason, and that reason is 24 that the spectrum that we were dealing with to begin -- when we started was already encumbered by a lot of operations.

There were already many licenses on all the channels

covering the bulk of the populated area of the country.

And so, what we set out to do was to develop a technique by which we could take parts of that spectrum and turn it around to use in a completely different orientation, in a completely different direction for signal flow than had been done previously, and at the same, endeavor to assure that licensees got the same level of protection that they had in the initial case.

In order to do that, we devised a very complex algorithm, admittedly so, and presented it to the FCC. In the process of working the rules and working the methodology through the FCC and with FCC staff, the FCC saw fit to increase the level of protection that's provided by the methodology.

So where, initially, we started with a condition that offered licensees an equivalent amount of interference protection to what they had at the beginning, it is now, in my estimation, overly protective by design. And that occurs as a result of there being layers of worst-case instances on top of one another. When I first put together the methodology, in fact, I had myself put in a number of worst-case parameters, and then, those were added to by the

FCC.

The point of this little discussion is that there have been some people questioning whether or not the software exactly follows the methodology, and whether there might be some remaining areas in which the software does not exactly follow the methodology. And the point is that, even if that is so -- and I don't know that, that that is so; in fact, I believe it not to be so, and I'll get to that in a minute -- but even if that were so, then there are so many layers of protection that the likelihood of either software package missing the calculation according to the methodology by a bit, and still resulting in interference is infinitesimal because of those multiple layers of worst cases that are piled on top of one another.

Let me point out that the different implementations will - you know, even done correctly, will product somewhat different results. That's because of, in fact, some of the factors that Leonard mentioned where there are different ways of doing things and still having them be correct.

I mean, it's likely that we will, for some time, continue to find some errors in the software. We are currently engaged -- by Sprint, in fact -- in evaluating the CelPlan software, and we have been literally taking it apart

and putting it back together again by looking at intermediate results that it produces, and comparing them to algorithms that we have written ourselves to manually work through the various aspects of the methodology so that we can then compare those intermediate results with what we see from CelPlan, and then, looking at the reasonableness of those results to see if they are close enough. And where they are, and we move on; where they're not, then we provide feedback to CelPlan.

In fact, we've done something very similar to that over the years with EDX, and we've been using EDX software since the early '90s. And even last year, for example, we found an error in an EDX routine, and we passed it back to EDX for them to incorporate into their software.

I'd point out that, despite errors in that software -- which has been around since the early '90s -- showing up from time to time, nobody has had to refile applications because of any of them.

So, bottom line, we're not trying to achieve perfection here, only a reasonable level of comfort that the software works properly. No software is perfect. We don't expect this software to be perfect. But we're trying to achieve a, as I say, a reasonable level of comfort. That's what we were hired by Spring to do in this case, in order to

make -- to help them be comfortable that what they were going to build and what they were going to ask their partners to sign onto, would, in fact, offer adequate levels of protection.

We believe, from what we've seen so far, that the CelPlan software does a very good job of implementing the methodology, and we continue to work our way through it, in excruciating detail, to find the last little vestiges where it may not, and where there may be some corrections that are needed. And we'll probably continue to do that for a long time.

That's not a reason for holding up the window.

That's not a reason for delaying things. We believe that,

from a good business standpoint, you have to, at some point,

go forward. And then, if you find something that is

problematic, you fix it, rather than delaying a massive

undertaking for the possibility that there might be a few

instances where something isn't exactly perfect.

So I think that's a summary of the approach that we're taking. And, you know, when you look at this from the standpoint of a business, it's the proper way for business decisions to be made.

MR. SCHWARTZ: All right. Are there questions for Merrill from the audience?

OPERATOR: Not at this time. I'd like to remind everyone to press Star 1.

MR. SCHWARTZ: Merrill, you said that you're still finding some errors in CelPlan software. Can you tell me what the last three errors you found in CelPlan are?

MR. WEIS: John, actually, I didn't say that. I said we're still looking for them.

MR. SCHWARTZ: Okay. Have you found any errors?

MR. WEIS: We've found errors over a period of time. Some of them were in some of the very earliest of the versions of the software. Those got fed back into CelPlan. In fact, some of them were significant. That was in the early stages. As far as I am aware, with the current release of the software, we have found no errors that we're currently working.

MR. SCHWARTZ: Okay. Well, you said the early stages. Roughly, what are we talking about in terms of time?

MR. WEIS: Well, we were working on this back in January and February and March, before its commercial release.

MR. SCHWARTZ: Um-hmm.

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MR. WEIS: And at that point, yes, we found some significant errors. That's part of what we were there to